Complete Summary

GUIDELINE TITLE

Evidence base for management of acute exacerbations of chronic obstructive pulmonary disease.

BIBLIOGRAPHIC SOURCE(S)

Snow V, Lascher S, Mottur-Pilson C. Evidence base for management of acute exacerbations of chronic obstructive pulmonary disease. Ann Intern Med 2001 Apr 3;134(7):595-9. [3 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Acute exacerbations of chronic obstructive pulmonary disease (COPD)

GUIDELINE CATEGORY

Diagnosis
Management
Risk Assessment

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Internal Medicine
Pulmonary Medicine

INTENDED USERS

Nurses
Physician Assistants
Physicians
Respiratory Care Practitioners

GUIDELINE OBJECTIVE(S)

To present evidence-based recommendations for the diagnostic evaluation, risk stratification, and therapeutic management of patients with acute exacerbations of chronic obstructive pulmonary disease (COPD)

TARGET POPULATION

Patients with acute exacerbations of chronic obstructive pulmonary disease (COPD) in the emergency department or inpatient setting.

Note: Patients with stable chronic obstructive pulmonary disease were not considered.

INTERVENTIONS AND PRACTICES CONSIDERED

1. Risk stratification
2. Diagnostic tests
    - Chest x-ray
    - Spirometric testing
3. Therapeutic interventions
    - Mucus clearance strategies
    - Bronchodilating agents
    - Corticosteroids
    - Antibiotics
    - Oxygen
    - Non-invasive mechanical ventilation

MAJOR OUTCOMES CONSIDERED

- Relapse as defined by return visit to the emergency department within 14 days of initial presentation.
- 6-month mortality rates
- Therapeutic efficacy

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Information was gathered through systematic searches and ongoing surveillance of MEDLINE (1966 to 2000, week 5), EMBASE (1974 to 2000, week 18), HealthStar (1975 to June 2000), and the Cochrane Controlled Trials Register (2000, Issue 1). Search strategies included the index terms and textwords chronic obstructive pulmonary disease and acute exacerbation and specific terms relating to interventions and outcomes. Variations on several search strategies were tested in order to locate the greatest number of relevant articles. The abstracts of relevant articles were reviewed against predetermined criteria and appropriate articles were retrieved; reference lists of retrieved articles were also examined.

From: Bach PB, Brown C, Gelfand SE, McCrory DC. Management of acute exacerbations of chronic obstructive pulmonary disease: a summary and appraisal of published evidence. Ann Intern Med 2001 Apr 3;134(7):600-20. (Electronic copies available from the American College of Physicians (ACP) Web site. [Also available as: McCrory DC, Brown C, Gelfand SE, Bach PB. Management of acute exacerbations of COPD: a summary and appraisal of published evidence. Chest 2001 Apr;119(4):1190-209. Electronic copies available to registered users only from the American College of Chest Physicians (ACCP) at the Chest journal Web site.])

NUMBER OF SOURCE DOCUMENTS

707 full-text articles

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Each retrieved study was evaluated for external validity and internal validity.

Internal Validity Scale for Observational Studies

Grade of Recommendation - Level of Evidence

Prognosis

A.
1a: Systematic review (with homogeneity) of inception cohort studies or a clinical practice guideline validated on a test set.
1b: Individual inception cohort study with ≥80% follow-up.
1c: All-or-none case series.
2a: Systematic review (with homogeneity) of either retrospective cohort studies or untreated control groups in randomized, controlled trials.

B.
2b: Retrospective cohort study or follow-up of untreated control patients in a randomized, controlled trial, or clinical practice guideline not validated in a test set.

2c/3: â œOutcomesâ research
C.
4: Case series (and poor-quality prognostic cohort studies).
D.
5: Expert opinion without explicit critical appraisal, or expert opinion based on physiology, bench research, or â œfirst principles.

Diagnostic

A.
1a: Systematic review (with homogeneity) of diagnostic studies or a clinical practice guideline validated on a test set.
1b: Independent blinded comparison of an appropriate spectrum of consecutive patients, all of whom have undergone both the diagnostic test and the reference standard.
1c: Diagnostic whose specificity is so high that a positive result rules in the diagnosis or a diagnostic finding whose sensitivity is so high that a negative result rules out the diagnosis (Absolute SpPins and SnNouts).
2a: Systematic review (with homogeneity) of studies with an internal validity score $\geq$2.
B.
2b: Independent blinded comparison in nonconsecutive patients or confined to a narrow spectrum of study patients (or both), all of whom have undergone both the diagnostic test and the reference standard, or a diagnostic clinical practice guideline not validated in a test set.
2c/3: Independent blinded comparison of an appropriate spectrum in which the reference standard was not applied to all study patients.
C.
4: Reference standard was not applied independently or was not applied blindly.
D.
5: Expert opinion without explicit critical appraisal, or expert opinion based on physiology, bench research, or â œfirst principles.

Internal Validity of Experimental Studies: Internal validity of experimental studies were evaluated using the scoring system of Jadad, et al, 1996 (Jadad, AR, Moore, RA, Carroll, D, et al. Assessing the quality of reports of randomized clinical trials: is blinding necessary? Control Clin Trials 1996;17[1]:1-12). Scores range from 0 to 5 and points are earned for adequate randomization, blinding, and assessment of withdrawals and dropouts.

From: Bach PB, Brown C, Gelfand SE, McCrory DC. Management of acute exacerbations of chronic obstructive pulmonary disease: a summary and appraisal of published evidence. Ann Intern Med 2001 Apr 3;134(7):600-20.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

From: Bach PB, Brown C, Gelfand SE, McCrory DC. Management of acute exacerbations of chronic obstructive pulmonary disease: a summary and appraisal of published evidence. Ann Intern Med 2001 Apr 3;134(7):600-20. (Electronic copies available from the American College of Physicians (ACP) Web site. [Also available as: McCrory DC, Brown C, Gelfand SE, Bach PB. Management of acute exacerbations of COPD: a summary and appraisal of published evidence. Chest 2001 Apr;119(4):1190-209. Electronic copies available to registered users only from the American College of Chest Physicians (ACCP) at the Chest journal Web site.])

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Approved by the American College of Physicians (ACP) Board of Regents on July 16, 2000 and by the American College of Chest Physicians' Board of Directors on July 1, 2000. These guidelines were also published in two peer-reviewed journals.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Recommendation 1. An admission chest radiography may be useful since it has been shown that up to 23% of patients admitted had changes in management related to findings on chest radiography. Chest radiography in patients visiting the emergency department may also useful. To date, there is no evidence for or against the utility of chest radiography in the office setting.

Recommendation 2. For patients hospitalized with an acute exacerbation of chronic obstructive pulmonary disease, acute spirometry should not be used to diagnose an exacerbation or to assess its severity.

Recommendation 3. Inhaled anticholinergic bronchodilators or inhaled short-acting beta2-agonists are beneficial in the treatment of patients presenting to the

hospital with acute exacerbation of chronic obstructive pulmonary disease. Since the inhaled anticholinergic bronchodilators have fewer and more benign side effects, consider these agents first. Only after the initial bronchodilator is at maximum dose is the addition of a second inhaled bronchodilator beneficial.

Recommendation 4. In the treatment of patients presenting to the hospital with moderate or severe acute exacerbation of chronic obstructive pulmonary disease, the following therapeutic options are beneficial: (a) systemic corticosteroids given for up to 2 weeks in patients who are not receiving long-term therapy with oral steroids, (b) noninvasive positive-pressure ventilation administered under the supervision of a trained physician, and (c) oxygen, with caution, in hypoxemic patients.

Recommendation 5. In patients with severe exacerbations of chronic obstructive pulmonary disease, initial narrow-spectrum antibiotics are reasonable first-line agents. The superiority of newer, more broad-spectrum antibiotics has not been established.

Randomized, placebo-controlled trials favored amoxicillin, trimethoprim-sulfamethoxazole, and tetracycline. Most of these studies were done before the emergence of multidrug-resistant organisms, particularly Streptococcus pneumoniae. To date, however, no randomized, placebo-controlled trials have proved the superiority of newer broad-spectrum antibiotics in acute exacerbations of chronic obstructive pulmonary disease. The trials also did not include nursing home residents or recently hospitalized patients.

Recommendation 6. In the treatment of patients with acute exacerbation of chronic obstructive pulmonary disease, the following therapeutic options are not beneficial: mucolytic medications, chest physiotherapy, and methylxanthine bronchodilators. The latter two options may be harmful.

Recommendation 7. Currently, there are no reliable methods of risk stratification for relapse or inpatient mortality.

CLINICAL ALGORITHM(S)

The following algorithm is available from the American College of Physicians (ACP) Web site:

- COPD Guideline Algorithm.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The best available evidence on each subtopic was selected for analysis. Randomized trials, sometimes buttressed by cohort studies, were used to evaluate therapeutic interventions. Cohort studies were used to evaluate diagnostic tests and risk stratification. See part 2 of the guideline: Bach PB, Brown C, Gelfand SE, McCrory DC. Management of acute exacerbations of chronic obstructive pulmonary disease: a summary and appraisal of published evidence. Ann Intern

Med 2001 Apr 3;134(7):600-20. (Electronic copies available from the American College of Physicians (ACP) Web site. [Also available as: McCrory DC, Brown C, Gelfand SE, Bach PB. Management of acute exacerbations of COPD: a summary and appraisal of published evidence. Chest 2001 Apr;119(4):1190-209. Electronic copies available to registered users only from the American College of Chest Physicians (ACCP) at the Chest journal Web site.])

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

General

- To improve the care that patients receive by identifying efficacious and inefficacious treatment strategies.
- To reduce the number and severity of annual exacerbations.

Specific

- Noninvasive positive-pressure ventilation (NPPV) is a beneficial support strategy that decreases risk for invasive mechanical ventilation and possibly improves survival in selected hospitalized patients with respiratory failure.

Subgroups Most Likely to Benefit:

- Patients with more severe exacerbations are more likely to experience the benefit of antibiotic therapy than those with less severe exacerbations.
- Oxygen therapy provides enormous benefits to hypoxemic patients with acute exacerbations of chronic obstructive pulmonary disease (that is, patients in whom PaO_2 is reduced). Oxygen relieves pulmonary vasoconstriction and right-heart strain and lessens myocardial ischemia, thereby improving cardiac output and oxygen delivery to the central nervous system and to other critical organs. In addition, a substantial amount of evidence supports the hypothesis that improved oxygen delivery to the lung enhances pulmonary defenses and augments mucociliary transport.

POTENTIAL HARMS

Bronchodilators

Adverse effects of bronchodilators vary. The side effects of ipratropium bromide are generally fewer and milder. Three randomized, controlled trials did not report any adverse effects with ipratropium bromide. Other effects include increased incidence of tremors and dry mouth and urinary retention when used in combination with albuterol. The adverse effects of albuterol include tremors, headache, nausea, vomiting, and palpitations. Adverse cardiovascular effects, such as changes in heart rate, blood pressure, and electrocardiography tracings, are also possible but rare. Adverse effects associated with theophylline include nausea, vomiting, headache, arrhythmias, and seizures. The effects are more significant among patients with higher levels of theophylline.

Corticosteroids

Hyperglycemia was the most common adverse effect associated with systemic corticosteroids for acute exacerbation of chronic obstructive pulmonary disease. In the Systemic Corticosteroids in Chronic Obstructive Pulmonary Disease Exacerbations (SCCOPE) trial (Niewoehner, DE, Erbland, ML, Deupree, RH, et al. Effect of systemic glucocorticoids on exacerbations of chronic obstructive pulmonary disease. N Engl J Med 1999;340[25]:1941-7), two thirds of hyperglycemic episodes requiring treatment occurred in patients who were known to have diabetes mellitus. Nearly all episodes occurred in the first 30 days.

Oxygen Therapy

The major concern for most clinicians administering oxygen therapy to patients with acute exacerbations of chronic obstructive pulmonary disease is that oxygen supplementation will lead to hypercarbia and subsequent respiratory failure.

Subgroups Most Likely to be Harmed:

- Adverse effects of bronchodilators are more significant among patients with higher levels of theophylline.
- Patients with simultaneous hypercarbia and hypoxemia are at greatest risk for respiratory failure associated with oxygen therapy.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- Despite the importance of this disease, the review of the evidence brings to light the paucity of high-quality studies on this subject. Nevertheless, recommendations in this guideline are based on the highest-quality evidence currently available. While the studies of "highest" quality were often randomized, controlled clinical trials, these were few in number and tended to enroll small numbers of patients. The clinician must consider this fact when basing management decisions on the guideline recommendations.
- Clinical practice guidelines are "guides" only and may not apply to all patients and all clinical situations. Thus, they are not intended to override clinicians' judgment. All American College of Physicians (ACP) clinical practice guidelines are considered (by the American College of Physicians) automatically withdrawn from or invalid five years after publication or once an update has been issued.
- The authors of the guideline are not responsible for its contents, including any clinical or treatment recommendations. No statement in the guideline should be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Snow V, Lascher S, Mottur-Pilson C. Evidence base for management of acute exacerbations of chronic obstructive pulmonary disease. Ann Intern Med 2001 Apr 3;134(7):595-9. [3 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 Apr 3

GUIDELINE DEVELOPER(S)

American College of Chest Physicians - Medical Specialty Society
American College of Physicians - Medical Specialty Society

GUIDELINE DEVELOPER COMMENT

The American College of Physicians (ACP) and the American College of Chest Physicians developed this evidence-based clinical practice guideline in collaboration. A joint expert panel examined the evidence and developed the recommendations. The numbers in square brackets in the guideline document are cross-references to the numbered sections in the accompanying background paper, "Management of Acute Exacerbations of Chronic Obstructive Pulmonary Disease: A Summary and Appraisal of Published Evidence," which is part 2 of the guideline. The guideline and background paper are based primarily on a systematic review compiled in an Agency for Healthcare Research and Quality evidence report prepared by the Evidence-based Practice Center at Duke University.

SOURCE(S) OF FUNDING

American College of Physicians (ACP), American College of Chest Physicians

GUIDELINE COMMITTEE

Joint Expert Panel on Chronic Obstructive Pulmonary Disease of the American College of Chest Physicians (ACCP) and the American College of Physicians (ACP)

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

ENDORSER(S)

American College of Chest Physicians Board of Directors - Medical Specialty Society
American College of Physicians-American Society of Internal Medicine Board of Regents - Medical Specialty Society

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American College of Physicians (ACP) Web site.

Print copies: Available from the American College of Physicians (ACP), 190 N. Independence Mall West, Philadelphia, PA 19106-1572.

AVAILABILITY OF COMPANION DOCUMENTS

The statements made by the American College of Physicians (ACP) and the American College of Chest Physicians in the guideline document are developed using the information provided in the following background papers:

- *Bach PB, Brown C, Gelfand SE, McCrory DC. Management of acute exacerbations of chronic obstructive pulmonary disease: a summary and appraisal of published evidence*. Ann Intern Med 2001 Apr 3;134(7):600-20 [129 references]. Electronic copies available from the ACP Web site.
- Management of acute exacerbations of chronic obstructive pulmonary disease. Rockville, MD: Agency for Healthcare Research and Quality. (Evidence Report/Technology Assessment; no. 19). Electronic copies and further information regarding the availability of print copies is available from the Agency for Healthcare Research and Quality (AHRQ) Web site.

Information contained in these background papers is represented in the methodology fields of the NGC Summary (i.e., Methods to Collect Evidence; Methods to Analyze the Evidence; Cost Analysis).

* Also available as:

- McCrory DC, Brown C, Gelfand SE, Bach PB. Management of acute exacerbations of COPD: a summary and appraisal of published evidence. Chest 2001 Apr;119(4):1190-209. Electronic copies available to registered users only from the American College of Chest Physicians (ACCP) at the Chest journal Web site.

The following is also available:

- COPD Guideline Algorithm. Electronic copies available from the ACP Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 24, 2001. The information was verified by the guideline developer as of July 30, 2001.

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Date Modified: 11/15/2004